

## CLAIMS

What is claimed as invention is:

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5 1. A gravity flow sludge load-out system for controlling the flow rate at which sludge is out-loaded, said system comprising:

at least one hopper having an outlet at its lower end, said at least one hopper for storing and delivering a volume of sludge load-out;

10 at least one sludge gate co-located at the outlet of said lower end of said at least one hopper, said sludge gate having a fully opened and a fully closed position and variable positions therebetween;

flow control means for automatically adjusting the position of said at least one sludge gate for controlling the flow of sludge load-out through said sludge gate; and

a support framework on which said hopper and said sludge gate are mounted.

15 2. The gravity flow sludge load-out system of claim 1 wherein said flow control means comprises:

an actuator for mechanically moving said sludge gate to and from its variable positions;

an operator interface terminal (OIT) for user input and display of sludge load-out data.

20 3. The gravity flow sludge load-out system of claim 2 wherein said sludge load-out data includes sludge batch weight and height level of sludge in said hopper.

4. The gravity flow sludge load-out system of claim 3, wherein said sludge load-out date further includes sludge flow rate.

5. The gravity flow sludge load-out system of claim 2 further comprising a programmable logic controller (PLC) operatively connected to said OIT and said actuator.

6. The gravity flow sludge load-out system of claim 5, wherein said flow control means further includes a weigh system for measuring the load-out weight, said weigh system comprising load cells mounted on said support framework below said at least one hopper and electrically connected to said PLC to transmit signals to said PLC.

7. The gravity flow sludge load-out system of claim 5 wherein said PLC continuously monitors the weight of load-out content in said at least one hopper, continually compares the load-out batch weight to the amount of sludge loaded out through said at least one sludge gate, and selectively adjusts the position of said sludge gate(s) to control the flow rate.

8. The gravity flow sludge load-out system of claim 5 wherein said flow control means includes sludge height/level sensors electrically connected to said PLC to transmit sludge level data to said PLC

9. The gravity flow sludge load-out system of claim 5 wherein said PLC continuously monitors the sludge weight remaining in said hopper during a load-out operation and systematically decreases the sludge flow rate as the weight of sludge in said hopper approaches a preselected batch load out weight.

10. The gravity flow sludge load-out system of claim 5 wherein said PLC continuously calculates the loss in weight per unit time of sludge from said hopper and adjusts the position of said sludge gate to maintain a constant flow rate.

11. The gravity flow sludge load-out system of claim 5 wherein said flow control means includes at least one position sensor located within each of said at least one sludge gate,

said position sensor(s) electrically connected to said PLC to transmit signals to said PLC.

~~12~~<sup>13</sup>. The gravity flow sludge load-out system of claim 1 wherein said at least one sludge gate is pneumatically powered.

~~13~~<sup>14</sup>. The gravity flow sludge load-out system of claim 1 wherein said at least one  
5 sludge gate is hydraulically powered.

~~14~~<sup>15</sup>. The gravity flow sludge load-out system of claim 1 wherein said at least one sludge gate is electrically powered.

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